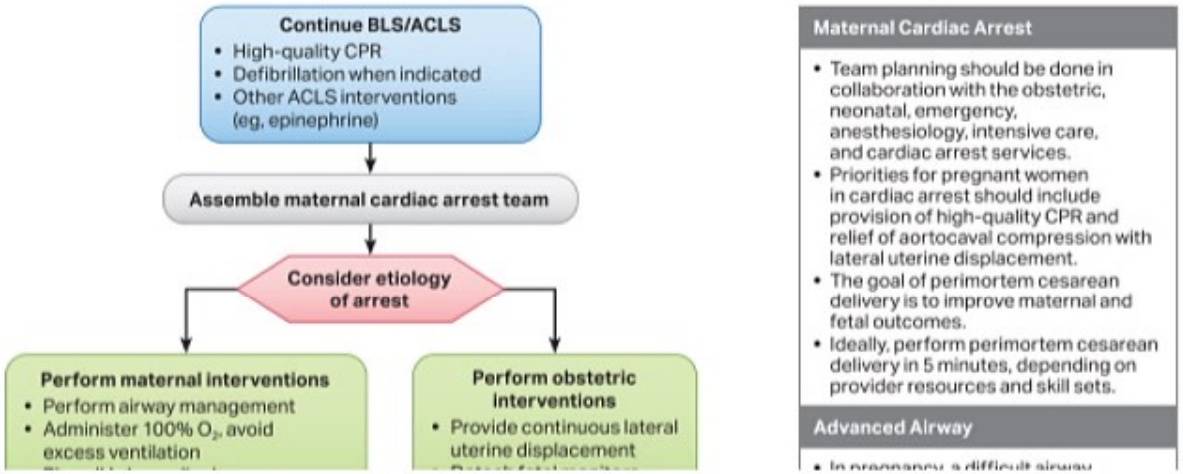
CARDIAC ARREST ASSOCIATED WITH PREGNANCY

Cardiac Arrest in Pregnancy In-Hospital ACLS Algorithm

The treatments listed in the Cardiac Arrest in Pregnancy In-Hospital ACLS Algorithm include recommendations for defibrillation, medications, and intubation. The algorithm is divided into 2 focuses (maternal interventions and obstetric interventions) to reflect the simultaneous resuscitation interventions of both the maternal resuscitation team and the obstetrical/neonatal team to improve team performance, efficiency, and success.

Cardiac Arrest in Pregnancy In-Hospital ACLS Algorithm

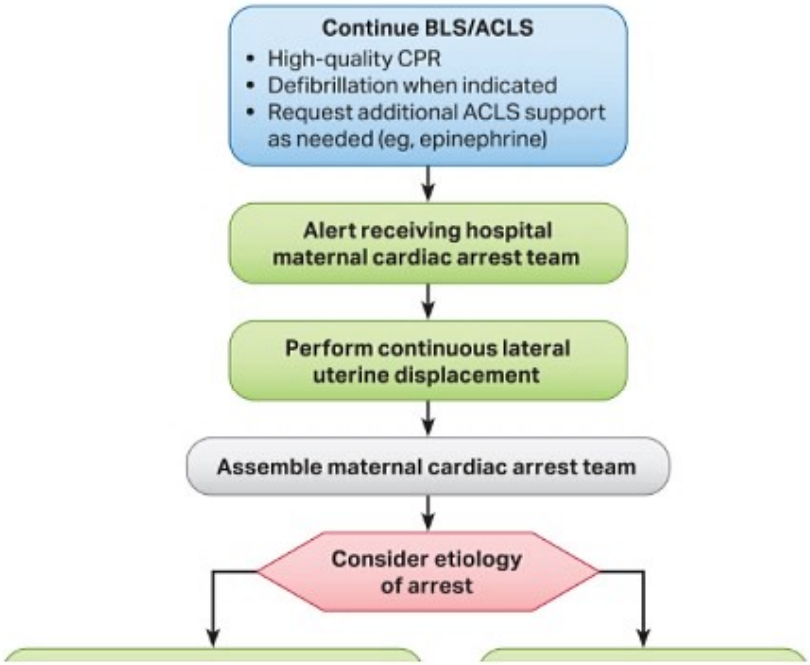


CARDIAC ARREST ASSOCIATED WITH PREGNANCY

Cardiac Arrest in Pregnancy Out-of-Hospital Algorithm

The Cardiac Arrest in Pregnancy Out-of-Hospital Algorithm is a BLS version.

Cardiac Arrest in Pregnancy Out-of-Hospital ACLS Algorithm



Maternal Cardiac Arrest

- Priorities for pregnant women in cardiac arrest should include provision of high-quality CPR and relief of aortocaval compression with lateral uterine displacement.

Potential Etiology of Maternal Cardiac Arrest

A Anesthetic complications
B Bleeding
C Cardiovascular
D Drugs
E Embolic
F Fever
G General nonobstetric causes of cardiac arrest (H's and T's)
H Hypertension

I KNEW | GOT IT NOW | THINK I GOT IT | I DON'T GET IT

What is the recommended CPR position for a third-trimester gravid patient?

CHOOSE THE CORRECT ANSWER

Trendelenburg position

On a backboard tilted at a 30° angle

Supine with manual left lateral uterine displacement

✓ Left-lateral decubitus position

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

What is the recommended **CPR position** for a **third-trimester gravid patient?**

Not there yet...

Your Answer | Left-lateral decubitus position

Correct Answer | Supine with manual left lateral uterine displacement

Learn more here: Cardiac Arrest Associated With Pregnancy

I Know It

CHALLENGE US

NEXT

What alterations are recommended for resuscitation drug administration to third-trimester gravid patients in cardiac arrest?

CHOOSE THE CORRECT ANSWER

- ✓ No dosing alterations are recommended
- Resuscitation drugs are not recommended
- Double the dose
- Reduce the dose by half

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

What **alterations** are recommended for resuscitation **drug administration** to **third-trimester gravid patients** in cardiac arrest?

You got it!

Your Answer | No dosing alterations are recommended

I Know It

CHALLENGE US

NEXT

When should resuscitation Team Leaders activate the protocol for perimortem cesarean delivery?

CHOOSE THE CORRECT ANSWER

When the patient develops asystole

When the patient remains unresponsive to 2 epinephrine doses

When the maternal resuscitation attempt is deemed futile

✓ As soon as cardiac arrest is identified in a pregnant patient

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

When should resuscitation Team Leaders activate the **protocol for perimortem cesarean delivery?**

You got it!

Your Answer | As soon as cardiac arrest is identified in a pregnant patient

I Know It

CHALLENGE US

NEXT

How quickly should resuscitation Team Leaders consider **perimortem cesarean delivery** after beginning resuscitative efforts if **return of spontaneous circulation has not been achieved?**

CHOOSE THE CORRECT ANSWER

10 minutes

15 minutes

✓ 5 minutes

8 minutes

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

How quickly should resuscitation Team Leaders consider **perimortem cesarean delivery** after beginning resuscitative efforts if **return of spontaneous circulation has not been achieved?**

You got it!

Your Answer | 5 minutes

I Know It

CHALLENGE US

NEXT

OPTIMAL OXYGENATION AND VENTILATION IN THE POST-CARDIAC ARREST PERIOD

The Adult Post-Cardiac Arrest Care Algorithm

The Adult Post-Cardiac Arrest Care Algorithm outlines the steps to immediately assess and manage post-cardiac arrest patients with ROSC. Team members must continue to maintain good ventilation and oxygenation with a bag-mask device or advanced airway and use the H's and T's to recall conditions that may have contributed to the cardiac arrest.

Optimize Ventilation and Oxygenation

After ROSC is obtained, the Adult Post-Cardiac Arrest Care Algorithm directs you to ensure an adequate airway and support breathing immediately after ROSC. An unconscious/unresponsive patient requires an advanced airway to mechanically support breathing.

- **Use continuous quantitative waveform capnography** to confirm and monitor correct placement of the ET tube.
- **Use the lowest inspired oxygen concentration that will maintain arterial oxyhemoglobin saturation of 92% to 98%.** When titrating inspired oxygen is not feasible (eg, in an out-of-hospital setting), it is reasonable to use 100% oxygen until the patient arrives at the emergency department.
- **Avoid excessive ventilation of the patient** (do not ventilate too fast or too much). You may **begin ventilation at 10/min and adjust to achieve** a **$PaCO_2$ of 35 to 45 mm Hg.**

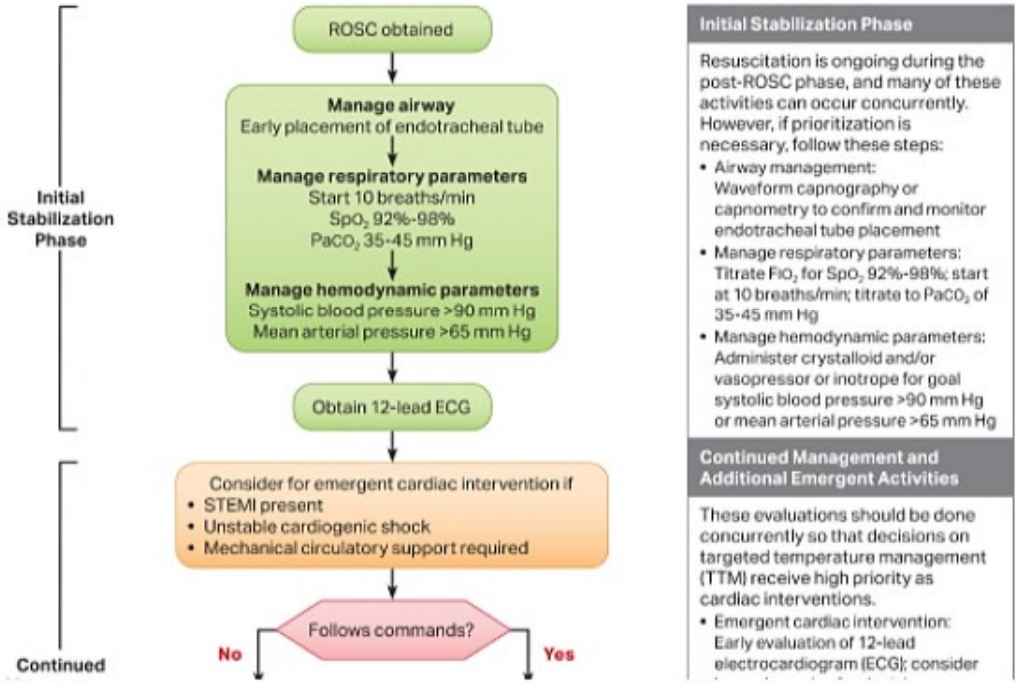
To avoid hypoxia in adults with ROSC after cardiac arrest, you may use the highest available oxygen concentration until you can measure the arterial oxyhemoglobin saturation or the partial pressure of arterial oxygen, if the appropriate equipment is available. **Decrease the fraction of inspired oxygen (FiO_2) when oxyhemoglobin saturation is 100% if you can maintain the oxyhemoglobin saturation at 92% to 98%.**

OPTIMAL OXYGENATION AND VENTILATION IN THE POST-CARDIAC ARREST PERIOD

saturation is 100% if you can maintain the oxyhemoglobin saturation at 92% to 98%.

Because an oxygen saturation of 99% or greater may correspond to a $PaCO_2$ between approximately 145 and 500 mm Hg, in general, **it is appropriate to wean FiO_2 for a saturation of 98% or greater to avoid hyperoxia as long as the patient can maintain oxyhemoglobin saturation of 92% to 98%.**

Adult Post–Cardiac Arrest Care Algorithm



Initial Stabilization Phase

Resuscitation is ongoing during the post-ROSC phase, and many of these activities can occur concurrently. However, if prioritization is necessary, follow these steps:

- Airway management: Waveform capnography or capnometry to confirm and monitor endotracheal tube placement
- Manage respiratory parameters: Titrate FiO_2 for SpO_2 92%-98%; start at 10 breaths/min; titrate to $PaCO_2$ of 35-45 mm Hg
- Manage hemodynamic parameters: Administer crystalloid and/or vasopressor or inotrope for goal systolic blood pressure >90 mm Hg or mean arterial pressure >65 mm Hg

Continued Management and Additional Emergent Activities

These evaluations should be done concurrently so that decisions on targeted temperature management (TTM) receive high priority as cardiac interventions.

- Emergent cardiac intervention: Early evaluation of 12-lead electrocardiogram (ECG); consider

OPTIMAL OXYGENATION AND VENTILATION IN THE POST-CARDIAC ARREST PERIOD

Quantitative Waveform Capnography

$ETCO_2$ is the concentration of carbon dioxide in exhaled air at the end of expiration, typically expressed as a partial pressure in millimeters of mercury ($PETCO_2$). There are **2 types of capnography devices**:

- **Mainstream** measures the CO_2 directly on the airway and sends the signal back to the device to display.
- **Sidestream** samples the gas from the airway and measures the CO_2 within the device. Because CO_2 is a trace gas in atmospheric air, CO_2 that capnography detects in exhaled air is produced in the body and delivered to the lungs by circulating blood.

Cardiac output is the major determinant of CO_2 delivery to the lungs. If ventilation is relatively constant, $PETCO_2$ correlates well with cardiac output during CPR.

Observe a persistent capnographic waveform with ventilation to confirm and monitor ET tube placement in the field, in the transport vehicle, on arrival at the hospital, and after any patient transfer to reduce the risk of unrecognized tube misplacement or displacement.

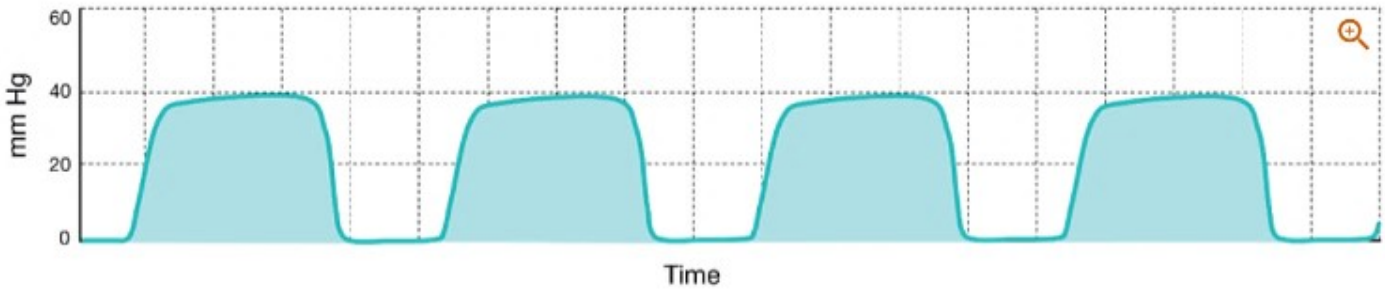
Although researchers have not studied capnography to confirm and monitor correct placement of supraglottic airways (eg, laryngeal mask airway, laryngeal tube, or esophageal-tracheal tube), effective ventilation through a supraglottic airway device should result in a capnography waveform during CPR and after ROSC.

A, Normal range of 35 to 45 mm Hg

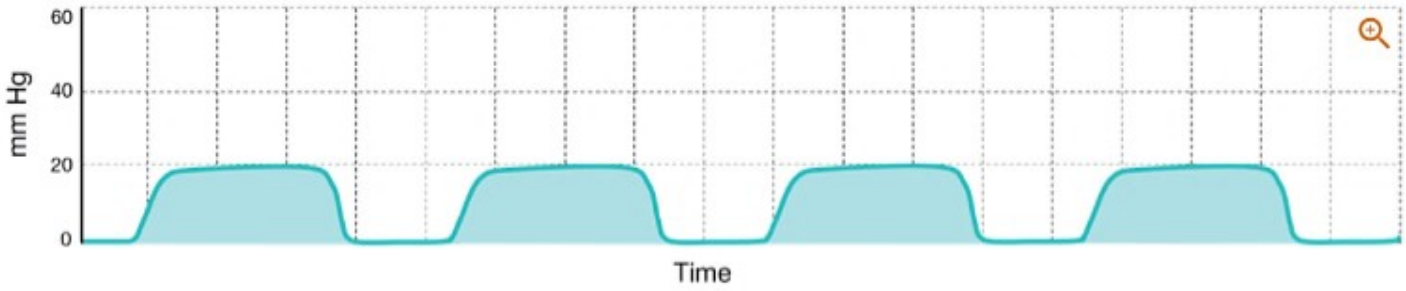
OPTIMAL OXYGENATION AND VENTILATION IN THE POST-CARDIAC ARREST PERIOD

Although researchers have not studied capnography to confirm and monitor correct placement of supraglottic airways (eg, laryngeal mask airway, laryngeal tube, or esophageal-tracheal tube), effective ventilation through a supraglottic airway device should result in a capnography waveform during CPR and after ROSC.

A, Normal range of 35 to 45 mm Hg



B, 20 mm Hg



I KNEW | GOT IT NOW | THINK I GOT IT | I DON'T GET IT

When titrating inspired oxygen, which **arterial oxyhemoglobin saturation** value lies within the **recommended range** for a patient who achieves return of spontaneous circulation?

CHOOSE THE CORRECT ANSWER

90%

✓ 95%

88%

99%

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

When titrating inspired oxygen, which **arterial oxyhemoglobin saturation** value lies within the **recommended range** for a patient who achieves return of spontaneous circulation?

You got it!

Your Answer | 95%

I Know It

CHALLENGE US

NEXT

When adjusting ventilation rates, which **$PETCO_2$ value** lies within the **recommended range** for a patient who achieves return of spontaneous circulation?

CHOOSE THE CORRECT ANSWER

55 mm Hg

30 mm Hg

✓ 40 mm Hg

20 mm Hg

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

When adjusting ventilation rates, which **$PETCO_2$ value** lies within the **recommended range** for a patient who achieves return of spontaneous circulation?

You got it!

Your Answer | 40 mm Hg

I Know It

CHALLENGE US

NEXT

OPTIMAL HEMODYNAMIC STATUS

Treat Hypotension (SBP Less Than 90 mm Hg)

To treat hypotension when SBP is less than 90 mm Hg, obtain IV access if not already established, and verify that any IV lines are open. Continue ECG monitoring after ROSC, during transport, and throughout ICU care until deemed clinically not necessary. At this stage, consider treating any reversible causes that might have precipitated the cardiac arrest but persist after ROSC.

Treat hypotension as follows:

- **IV bolus: 1 to 2 L normal saline** or lactated Ringer's solution.
- **Norepinephrine: 0.1 to 0.5 mcg/kg per minute** (in 70-kg adult: 7 to 35 mcg per minute) IV infusion adjusted to achieve a minimum SBP of greater than 90 mm Hg or a mean arterial pressure of greater than 65 mm Hg. Norepinephrine (levarterenol), a naturally occurring potent vasoconstrictor and inotropic agent, may be effective for managing patients with severe hypotension (eg, SBP less than 70 mm Hg) and a low total peripheral resistance who do not respond to less potent adrenergic drugs such as dopamine, phenylephrine, or methoxamine.
- **Epinephrine: 2 to 10 mcg per minute IV infusion** adjusted to achieve a minimum SBP of greater than 90 mm Hg or a mean arterial pressure of greater than 65 mm Hg. Epinephrine can be used in patients who are not in cardiac arrest but who require inotropic or vasopressor support.
- **Dopamine: 5 to 20 mcg/kg per minute IV infusion** adjusted to achieve a minimum SBP of greater than 90 mm Hg or a mean arterial pressure of greater than 65 mm Hg. Dopamine hydrochloride is a catecholamine-like agent and a chemical precursor of norepinephrine that stimulates the heart through both α- and β-adrenergic receptors.

What is the recommended **fluid bolus dose** for patients who are **hypotensive** during the **post–cardiac arrest phase?**

CHOOSE THE CORRECT ANSWER

3 to 4 L

✓ 1 to 2 L

10 mL/Kg

20 mL/Kg

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

What is the recommended **fluid bolus dose** for patients who are **hypotensive** during the **post–cardiac arrest phase?**

You got it!

Your Answer | **1 to 2 L**

I Know It

CHALLENGE US

NEXT

What is the recommended norepinephrine dose for hypotensive patients during the post-cardiac arrest phase?

CHOOSE THE CORRECT ANSWER

- 0.6 to 1.0 mcg/kg per minute
- 0.01 to 0.05 mcg/kg per minute
- 0.06 to 0.09 mcg/kg per minute
- ✓ 0.1 to 0.5 mcg/kg per minute

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

What is the recommended **norepinephrine dose** for **hypotensive patients** during the **post-cardiac arrest phase?**

You got it!

Your Answer | **0.1 to 0.5 mcg/kg per minute**

I Know It

CHALLENGE US

NEXT

What is the recommended starting IV infusion dose of epinephrine for patients in cardiac arrest who achieve ROSC and need vasopressor support?

CHOOSE THE CORRECT ANSWER

- ✓ 2 to 10 mcg per minute
- 1 to 4 mcg/kg per minute
- 10 to 20 mcg per minute
- 2 to 5 mcg/kg per minute

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

What is the recommended starting **IV infusion dose of epinephrine** for patients in cardiac arrest who achieve ROSC and need vasopressor support?

You got it!

Your Answer | **2 to 10 mcg per minute**

I Know It

CHALLENGE US

NEXT

What is the mean arterial pressure target when administering epinephrine to patients in cardiac arrest who achieve return of spontaneous circulation and need vasopressor support?

CHOOSE THE CORRECT ANSWER

55 mm Hg

✓ 65 mm Hg

70 mm Hg

75 mm Hg

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

What is the **mean arterial pressure target when administering epinephrine** to patients in cardiac arrest who achieve return of spontaneous circulation and need vasopressor support?

You got it!

Your Answer | 65 mm Hg

I Know It

CHALLENGE US

NEXT

IMPORTANCE OF EARLY ACQUISITION OF 12-LEAD ECG

Treat the precipitating cause of cardiac arrest after ROSC and initiate or request studies that will further help evaluate the patient. You must identify and treat any cardiac, electrolyte, toxicologic, pulmonary, and neurologic precipitants of arrest. Overall, the most common cause of cardiac arrest is cardiovascular disease and associated coronary ischemia, so **obtain a 12-lead ECG as soon as possible to detect ST-segment elevation or left bundle branch block**.

Coronary Angiography

Perform coronary angiography right away (rather than later in the hospital stay or not at all) for OHCA patients with suspected cardiac etiology of arrest and ST-segment elevation on ECG. When you highly suspect acute myocardial infarction (AMI), activate local protocols for treatment and coronary reperfusion. Coronary angiography, if indicated, can be beneficial in post–cardiac arrest patients regardless of whether they are awake or comatose. It is unclear whether emergent coronary angiography is beneficial for post–cardiac arrest patients without STEMI.

Expert Consultation

In the absence of evidence identifying the optimal timing for coronary angiography and PCI in post–cardiac arrest patients suspected of having acute coronary syndromes as the cause of their cardiac arrest but without ST-segment elevation, an interventional cardiologist should be consulted for each patient to determine timing of angiography and PCI based on local protocols. Concurrent PCI and TTM are safe, with good outcomes reported for some comatose patients who have undergone PCI.

IMPORTANCE OF EARLY ACQUISITION OF 12-LEAD ECG

STEMI Is Present or High Suspicion of AMI

PREVIOUS 1 2

I KNEW | GOT IT NOW | THINK I GOT IT | I DON'T GET IT

What is the purpose of obtaining a 12-lead electrocardiogram early during the post–cardiac arrest care phase?

CHOOSE THE CORRECT ANSWER

To establish a baseline for future comparison

To identify a life-threatening arrhythmia

To evaluate the need for a pacemaker

✓ To detect ST-segment elevation or left bundle branch block

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

What is the **purpose** of obtaining a **12-lead electrocardiogram** early during the post–cardiac arrest care phase?

You got it!

Your Answer | To detect ST-segment elevation or left bundle branch block

I Know It

CHALLENGE US

NEXT

During the **post–cardiac arrest care** period, the **12-lead electrocardiogram** reveals an **ST-segment elevation myocardial infarction.**

Which step has the **highest priority?**

CHOOSE THE CORRECT ANSWER

Evaluate the patient's ability to follow verbal commands

Obtain computed tomographic imaging

Intensive care unit/critical care unit admission

✓ Coronary angiography

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

87% | PROGRESS: HeartCode ACLS 2025

~2h 9m left

Ahmed Othman

During the **post-cardiac arrest care** period, the **12-lead electrocardiogram** reveals an **ST-segment elevation myocardial infarction.**

Which step has the **highest priority**?

You got it!

Your Answer | **Coronary angiography**

I Know It

CHALLENGE US

NEXT

IMPORTANCE OF RAPID DELIVERY TO THE CATHETERIZATION LABORATORY AFTER ACHIEVING ROSC FOR PATIENTS WITH STEMI

The EMS team transports the patient to an emergency department (ED) or cardiac catheterization laboratory before the patient is transferred to an ICU for continued care. In contrast, patients who are already in the hospital depend on a professional system of appropriate surveillance and prevention of cardiac arrest. Reperfusion therapy opens an obstructed coronary artery with either mechanical means or drugs. **Percutaneous coronary intervention (PCI), performed in the cardiac catheterization laboratory after coronary angiography, allows balloon dilation and/or stent placement for an obstructed coronary artery.**

Coronary Reperfusion

Begin aggressive treatment, including coronary reperfusion with PCI, if you detect an ST-segment elevation myocardial infarction (STEMI) after ROSC, regardless of coma or targeted temperature management (TTM). In cases of out-of-hospital STEMI, provide advance notification to receiving facilities.

I KNEW | GOT IT NOW | THINK I GOT IT | I DON'T GET IT

CHALLENGE US

What is an advantage of primary percutaneous coronary intervention in a catheterization laboratory for patients with cardiac arrest secondary to coronary artery occlusion once they achieve return of spontaneous circulation?

CHOOSE THE CORRECT ANSWER

It improves brain recovery in comatose patients

It eliminates the need for mechanical ventilation

It reduces the need for narcotic analgesics

✓ It restores blood flow in an infarction-related artery

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

What is an **advantage** of **primary percutaneous coronary intervention** in a catheterization laboratory for patients with cardiac arrest secondary to coronary artery occlusion once they achieve return of spontaneous circulation?

You got it!

Your Answer | It restores blood flow in an infarction-related artery

I Know It

CHALLENGE US

NEXT

TARGETED TEMPERATURE MANAGEMENT

Targeted Temperature Management

TTM is the only intervention demonstrated to improve neurologic recovery after cardiac arrest. The **optimal duration of TTM is at least 24 hours**, and although comparative studies of the duration of TTM have not been performed in adults, hypothermia for up to 72 hours was used safely in newborns.

During TTM, **monitor the patient's core temperature by using an esophageal thermometer, bladder catheter in nonanuric patients, or a pulmonary artery catheter** if one is already in place for other indications. Axillary, oral, and rectal temperatures do not adequately measure core temperature changes.

TTM should not affect the decision to perform PCI, because concurrent PCI and hypothermia are reported to be feasible and safe.

Brain injury and cardiovascular instability are the major factors that determine survival after cardiac arrest. Because TTM is currently the only intervention demonstrated to improve neurologic recovery, consider TTM for any patient who is comatose and unresponsive to verbal commands after ROSC.

TARGETED TEMPERATURE MANAGEMENT

Targeted Temperature Ranges

For TTM, healthcare providers should select and maintain a constant target temperature between **32°C and 36°C for at least 24 hours**. Although the optimal method of achieving the target temperature is unknown, any combination of rapid infusion of ice-cold, isotonic, non–glucose-containing fluid (30 mL/kg), endovascular catheters, surface cooling devices, or simple surface interventions (eg, ice bags) appears to be safe and effective.

Specific patient features may necessitate selecting one temperature over another for TTM. **Higher temperatures** might be preferable in patients for whom lower temperatures convey some risk (eg, bleeding), and **lower temperatures** might be preferable when patients have clinical features that worsen at higher temperatures (eg, seizures, cerebral edema). Of note, temperature control between 32°C and 36°C is not contraindicated in any patients, so all patients who require intensive care are eligible.

In the prehospital setting, do not routinely cool patients after ROSC with rapid infusion of cold IV fluids. Current evidence indicates no direct outcome benefit from these interventions, and IV fluid administration in the prehospital setting may increase pulmonary edema and rearrest. We don't yet know whether different methods or devices for temperature control outside of the hospital are beneficial.

- During the **post–cardiac arrest care phase**, your team has optimized the patient's oxygenation, ventilation, and hemodynamic status.
- The patient's **12-lead electrocardiogram** identifies an **ST-segment elevation myocardial infarction**, and the patient is being prepped for transport to the catheterization laboratory to undergo **coronary reperfusion therapy**.

Why is it important to assess the patient's ability to follow commands?

CHOOSE THE CORRECT ANSWER

To prepare the critical care unit for the patient's arrival

To select the most appropriate reperfusion strategy

✓ To determine the need for targeted temperature management

To determine the need for anesthesia in the catheterization laboratory

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

- During the **post–cardiac arrest care phase**, your team has optimized the patient's oxygenation, ventilation, and hemodynamic status.
- The patient's **12-lead electrocardiogram** identifies an **ST-segment elevation myocardial infarction**, and the patient is being prepped for transport to the catheterization laboratory to undergo **coronary reperfusion therapy**.

Why is it important to assess the patient's ability to follow commands?

You got it!

Your Answer | To determine the need for targeted temperature management

I Know It

CHALLENGE US

NEXT

If the patient is not following commands, start targeted temperature management as soon as possible with what targeted temperature range?

CHOOSE THE CORRECT ANSWER

30°C to 32°C

28°C to 30°C

36°C to 38°C

✓ 32°C to 36°C

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

89% PROGRESS: HeartCode ACLS 2025

~1h 58m left

Ahmed Othman

If the patient is not following commands, start targeted temperature management as soon as possible with what targeted temperature range?

You got it!

Your Answer | 32°C to 36°C

I Know It

CHALLENGE US

NEXT

MOST COMMON REVERSIBLE CAUSES (H'S AND T'S)

The H's and T's are a memory aid for potential reversible causes of hemodynamic instability during post–cardiac arrest care.

H's

- Hypovolemia
- Hypoxia
- Hydrogen ion (acidosis)
- Hypo-/hyperkalemia
- Hypothermia

T's

- Tension pneumothorax
- Tamponade (cardiac)
- Toxins
- Thrombosis (pulmonary)
- Thrombosis (coronary)

Hypovolemia and hypoxia are the 2 most common underlying and potentially reversible causes of PEA. Look for evidence of these problems as you assess the patient.

In addition to hypovolemia, what is the **most common** underlying, potentially reversible **cause** of **pulseless electrical activity**?

CHOOSE THE CORRECT ANSWER

- Hypothermia
- Thrombosis
- Tension pneumothorax
- ✓ Hypoxia

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

In addition to hypovolemia, what is the **most common** underlying, potentially reversible **cause** of **pulseless electrical activity**?

You got it!

Your Answer | **Hypoxia**

I Know It

CHALLENGE US

NEXT

APPROPRIATE DESTINATION FOR A PATIENT IN THE POST-CARDIAC ARREST PERIOD

Critical care facilities that treat patients after cardiac arrest should use a comprehensive care plan that includes acute cardiovascular interventions, use of TTM, standardized medical goal-directed therapies, and advanced neurologic monitoring and care.

Determining neurologic prognosis is inaccurate during the first 72 hours after resuscitation in patients not treated with TTM. For those treated with TTM, you should wait 72 hours after the patient returns to normothermia. Prognostication using clinical examination may be confounded by sedation or paralysis, so these factors must be considered carefully before considering a withdrawal of life-sustaining therapy on the basis of neuroprognostication. Many initially comatose survivors of cardiac arrest have the potential for full recovery, so **it is important to place patients in a hospital critical care unit where experts can perform neurologic evaluation and appropriate testing to aid prognosis in a timely manner**.

Advanced Critical Care

After coronary reperfusion interventions, or if the post–cardiac arrest patient has no ECG evidence or suspicion of myocardial infarction, the high-performance team should transfer the patient to an ICU.

I KNEW | GOT IT NOW | THINK I GOT IT | I DON'T GET IT

CHALLENGE US

What is the recommended destination for a post–cardiac arrest patient after coronary reperfusion and initiation of targeted temperature management?

CHOOSE THE CORRECT ANSWER

- Medical surgical unit
- Telemetry unit
- ✓ Intensive care unit
- Emergency department

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

What is the **recommended destination for a post–cardiac arrest patient** after coronary reperfusion and initiation of targeted temperature management?

You got it!

Your Answer | **Intensive care unit**

I Know It

CHALLENGE US

NEXT

What is an advantage of placing a post–cardiac arrest patient in a critical care bed after coronary reperfusion interventions?

CHOOSE THE CORRECT ANSWER

- The patient can receive titrated oxygen therapy
- Access by family members is easier
- Experts can perform timely neurologic evaluation
- ✓ Targeted temperature management occurs there

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

What is an **advantage** of placing a post–cardiac arrest patient in a **critical care bed after coronary reperfusion** interventions?

Not there yet...

Your Answer | Targeted temperature management occurs there

Correct Answer | Experts can perform timely neurologic evaluation

Learn more here: Appropriate Destination for a Patient in the Post-Cardiac Arrest Period

I Know It

CHALLENGE US

NEXT

FACTORS INVOLVED WITH NEUROPROGNOSTICATION AFTER ROSC

Neuroprognostication

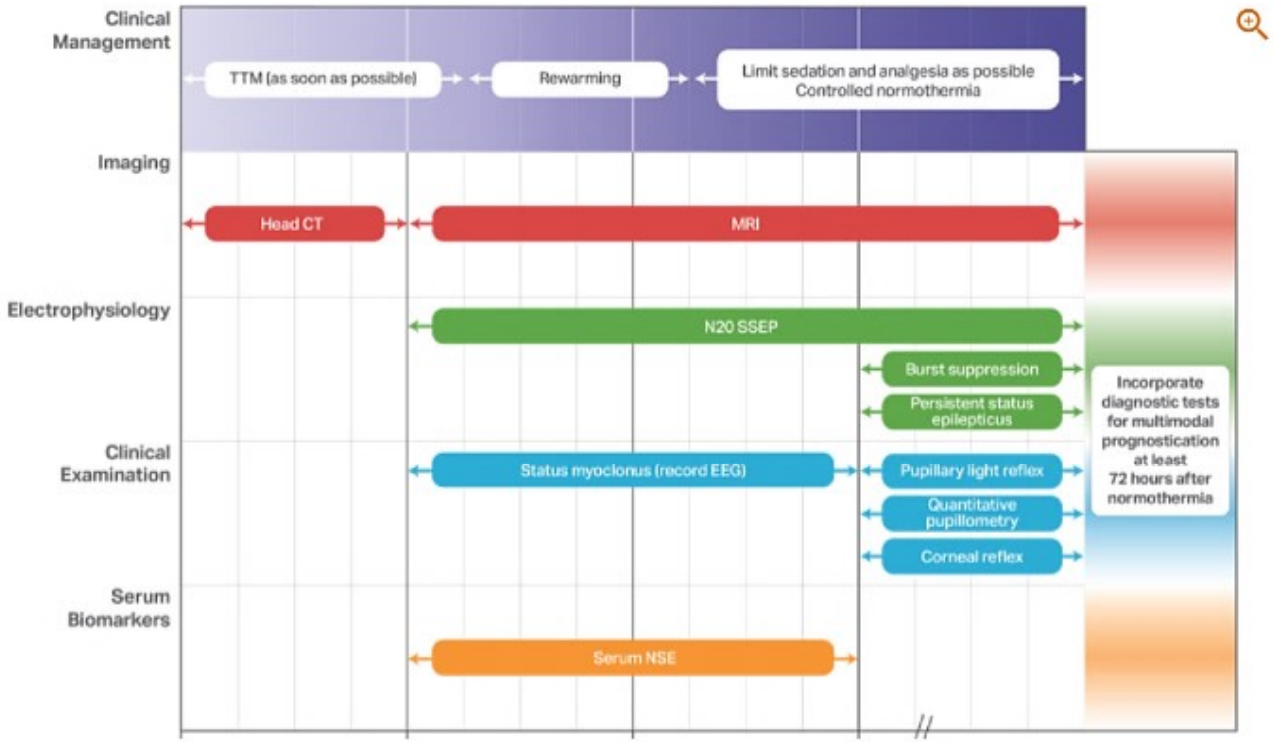
Accurate neurologic prognostication is important to avoid inappropriate withdrawal of life-sustaining treatment in patients who may otherwise achieve meaningful neurologic recovery and also to avoid ineffective treatment when poor outcome is inevitable.

Neuroprognostication relies on interpreting the results of diagnostic tests and correlating those results with outcome. Given that a false-positive test result for poor neurologic outcome could lead to inappropriate withdrawal of life support from a patient who otherwise would have recovered, the most important test characteristic is specificity. **Many of the tests considered are subject to error due to the effects of medications, organ dysfunction, and temperature.** Furthermore, many research studies have methodologic limitations, including small sample sizes, single-center design, lack of blinding, the potential for self-fulfilling prophecies, and the use of outcome at hospital discharge rather than a time point associated with maximal recovery (typically 3 to 6 months after arrest).

Because any single method of neuroprognostication has an intrinsic error rate and may be subject to confounding, multiple modalities should be used to improve decision-making accuracy.

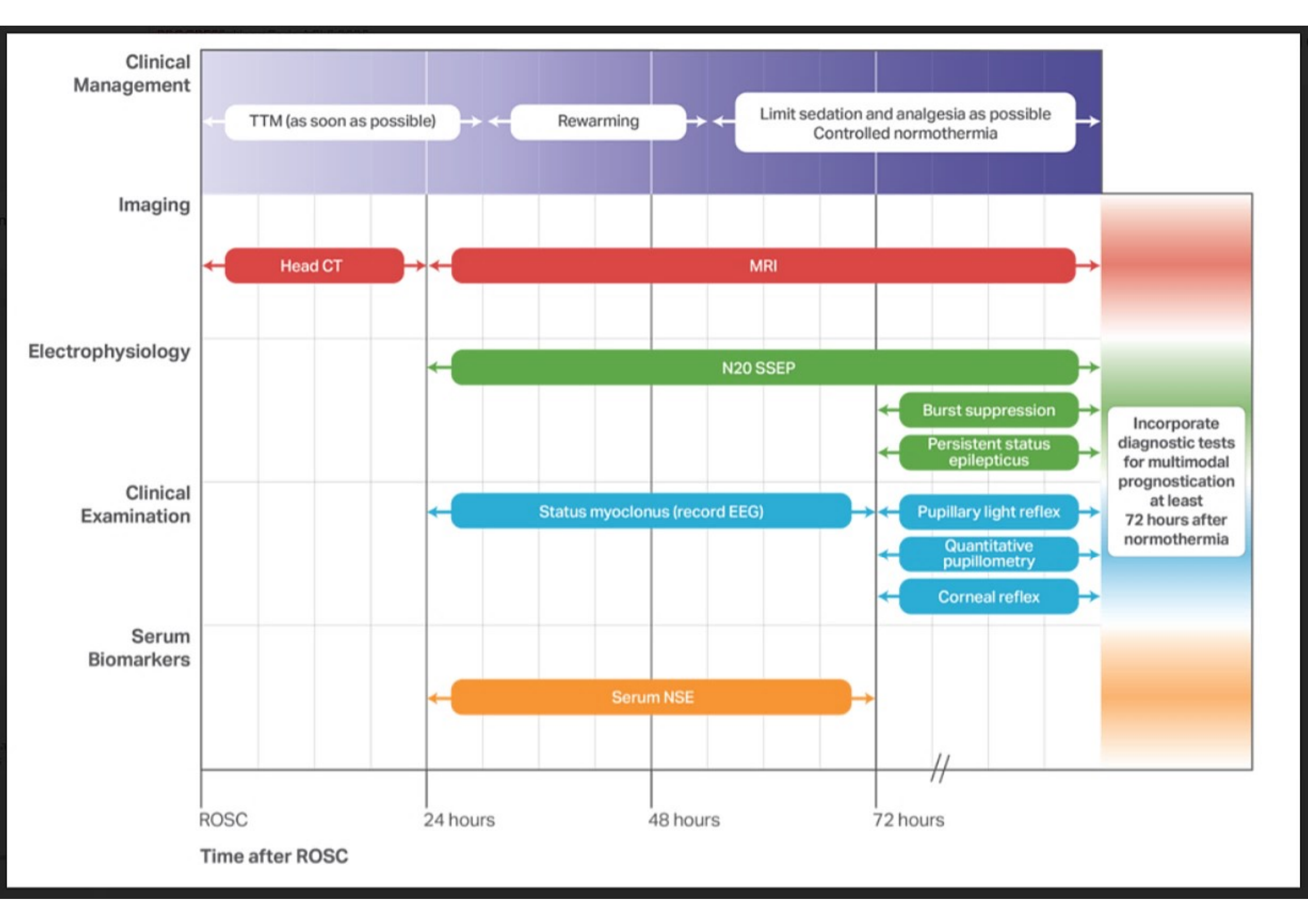
FACTORS INVOLVED WITH NEUROPROGNOSTICATION AFTER ROSC

Neuroprognostication Diagram



PREVIOUS 1 2

I KNEW | GOT IT NOW | THINK I GOT IT | I DON'T GET IT


Clinical Management
TTM (as soon as possible)
Rewarming
Limit sedation and analgesia as possible
Controlled normothermia
Imaging
Head CT
MRI
Electrophysiology
N20 SSEP
Burst suppression
Persistent status epilepticus
Clinical Examination
Status myoclonus (record EEG)
Pupillary light reflex
Quantitative pupillometry
Corneal reflex
Serum Biomarkers
Serum NSE
Incorporate diagnostic tests for multimodal prognostication at least 72 hours after normothermia
ROSC
24 hours
48 hours
72 hours
Time after ROSC

Which factor can confound neuroprognostication during the post–cardiac arrest phase?

CHOOSE THE CORRECT ANSWER

Serum glucose levels

Oxygen saturation values

Hemoglobin and hematocrit levels

✓ Targeted temperature management

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

Which **factor can confound neuroprognostication** during the post–cardiac arrest phase?

You got it!

Your Answer | Targeted temperature management

I Know It

CHALLENGE US

NEXT

How long should you wait to determine the neurologic prognosis of a patient treated with targeted temperature management after the patient returns to normothermia?

CHOOSE THE CORRECT ANSWER

48 hours

12 hours

✓ 72 hours

24 hours

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

How long should you wait to determine the neurologic prognosis of a patient treated with targeted temperature management after the patient returns to normothermia?

You got it!

Your Answer | 72 hours

I Know It

CHALLENGE US

NEXT

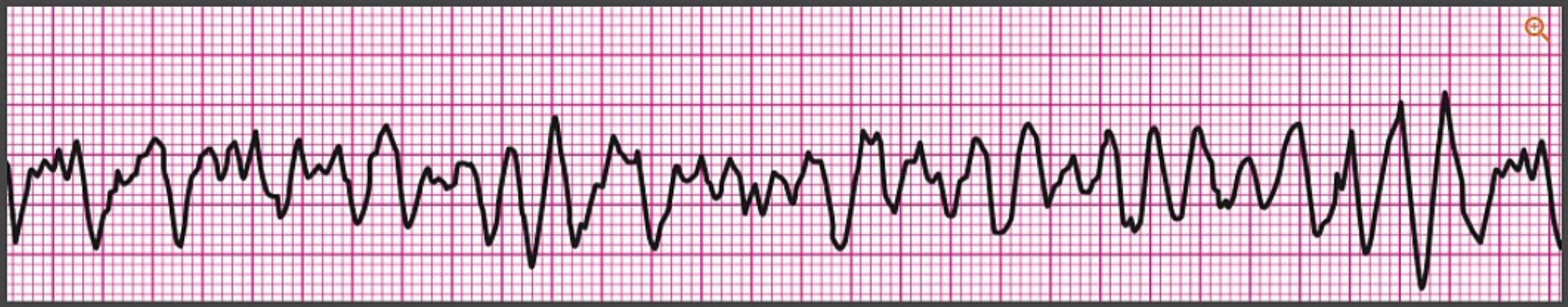
Introduction

Your ALS team is dispatched for a 70-year-old woman who suddenly collapsed while on her morning jog. Bystander CPR was performed, and the patient did not respond to initial BLS, including initial defibrillation with an AED. The scene is safe.

CHALLENGE US NEXT

As Team Leader, you conduct the primary assessment, including rhythm analysis, while high-quality BLS continues.

What type of rhythm is being displayed on the monitor?



CHOOSE THE CORRECT ANSWER

- Asystole
- Supraventricular tachycardia
- ✓ Ventricular fibrillation
- Ventricular tachycardia

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

Based on the patient's condition, what is your next action?

CHOOSE THE CORRECT ANSWER

- Continue CPR while delivering a shock
- Pause CPR to establish IV/IO access
- ✓ Shock immediately
- Continue CPR while you establish IV/IO access

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

After a shock is delivered, CPR resumes immediately.

What action also needs to be performed at this time?

CHOOSE THE CORRECT ANSWER

- Perform a second rhythm check
- Administer amiodarone or lidocaine
- Consider an advanced airway
- ✓ Establish IV/IO access

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

After 2 minutes, the team pauses CPR for a rhythm check.

What rhythm is now being demonstrated by the patient?

CHOOSE THE CORRECT ANSWER

Asystole

✓ Ventricular tachycardia

Pulseless electrical activity

Ventricular fibrillation

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

The patient is showing persistent pulseless ventricular tachycardia.

What actions need to be completed next by the team? (Place in the correct order.)

RANK ITEMS BY DRAGGING AND DROPPING:

- Shock immediately
- Resume CPR
- Administer epinephrine 1 mg IV
- Consider an advanced airway

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

At the next pulse check, compressors are switched, and rhythm continues to be refractory ventricular fibrillation/ventricular tachycardia. A shock is delivered and CPR is resumed.

What is your next intervention?

CHOOSE THE CORRECT ANSWER

Administer epinephrine 1 mg IV

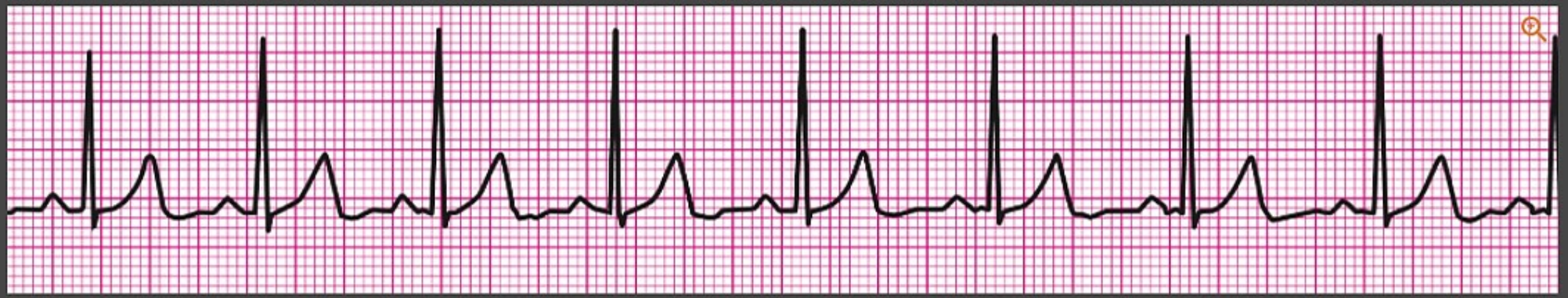
Administer procainamide 15 to 18 mg/kg IV loading dose

✓ Administer amiodarone 300 mg IV

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

After 2 more minutes of CPR, you conduct a rhythm check and pulse check, confirming absence of a pulse.

Based on the organized rhythm below, describe the patient's condition?



CHOOSE THE CORRECT ANSWER

Normal sinus rhythm

Junctional rhythm

Sinus bradycardia

✓ Pulseless electrical activity

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

Once PEA is identified and there are no signs of ROSC, you continue CPR.

What is your next step for appropriate care for this patient?

CHOOSE THE CORRECT ANSWER

- ✓ Administer epinephrine 1 mg IV
- Administer amiodarone 300 mg IV
- Administer amiodarone 150 mg IV
- Administer epinephrine 1.5 mg IV

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

After 2 minutes of CPR, you conduct another rhythm check and determine that the patient has the following rhythm, palpable pulse, and is showing signs of ROSC.

How do you continue treating this patient?

CHOOSE THE CORRECT ANSWER

Pause CPR and consider an advanced airway

Resume CPR and repeat the steps of the PEA pathway

Administer another dose of 1 mg of epinephrine

✓ Move to the Adult Post–Cardiac Arrest Care Algorithm

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

1 2 3 4 5 6 7 8 9 10 11

Your score is: 100 %

Congratulations! You successfully completed steps of the **Adult Cardiac Arrest Algorithm**.

Select **NEXT** to continue with the program.
If you wish to review the questions, click on the question numbers above.

Adult Cardiac Arrest Algorithm

Provider Manual

CHALLENGE US NEXT

Introduction

You are attempting to resuscitate a 70-year-old woman who suffered a sudden cardiac arrest. She is showing signs of return of spontaneous circulation (ROSC). She is intubated and has an IV established.

CHALLENGE US

NEXT

She has a palpable pulse, **HR** of 65/min **SpO_2** of 94%, **$ETCO_2$** of 38 mm Hg, and **BP** 82/55 mm Hg.

What are your highest priorities?

SELECT ALL THAT APPLY

- [ ] Maintaining a target $PaCO_2$ between 45 and 55 mm Hg
- [ ] Maintaining SpO_2 92% to 98%
- [x] Ventilating the patient with 10 breaths per minute
- [ ] Hyperventilation
- [ ] Maintaining a target $PaCO_2$ between 35 and 45 mm Hg

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

In addition to managing the airway and respiratory parameters, which step is also prioritized during the initial stabilization phase?

CHOOSE THE CORRECT ANSWER

Initiating targeted temperature management

Performing percutaneous coronary intervention

✓ Treating hypotension

Administering alteplase

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

Match the treatment for hypotension to the proper initial dosage for an adult based on the AHA guidelines.

MATCH ITEMS

Norepinephrine IV	Epinephrine	Normal saline or lactated Ringer's	Dopamine IV
0.1 to 0.5 mcg/kg per minute	2 to 10 mcg per minute	1 to 2 L	5 to 20 mcg/kg per minute

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

The patient's ventilation and blood pressure have responded to treatment.

What other lab or diagnostic tests would be appropriate to consider at this time for reversible causes?

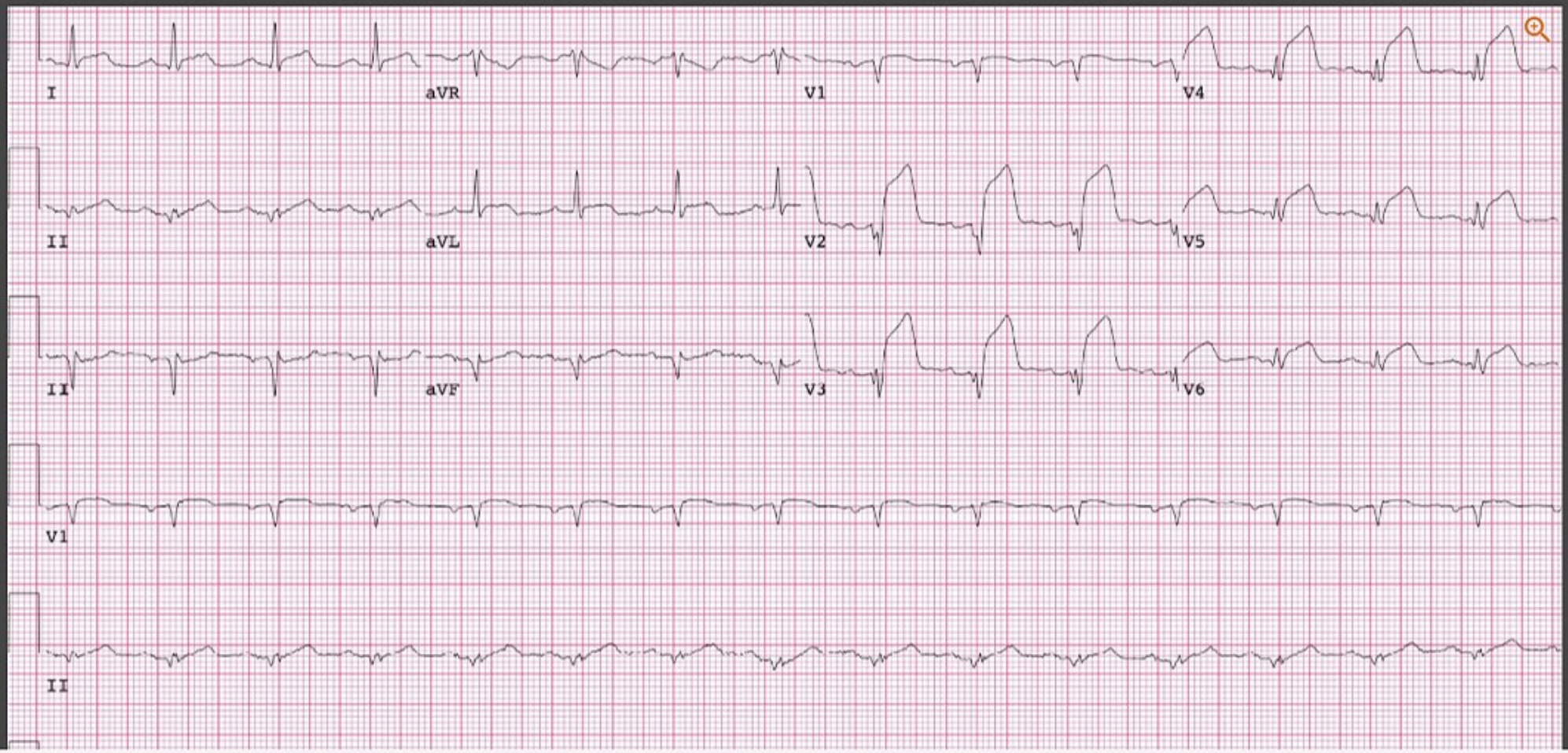
SELECT ALL THAT APPLY

- [x] Temperature
- [x] Arterial blood carbon dioxide
- [x] Arterial blood oxygen
- [x] 12-lead ECG
- [x] Capnography
- [x] Troponin test

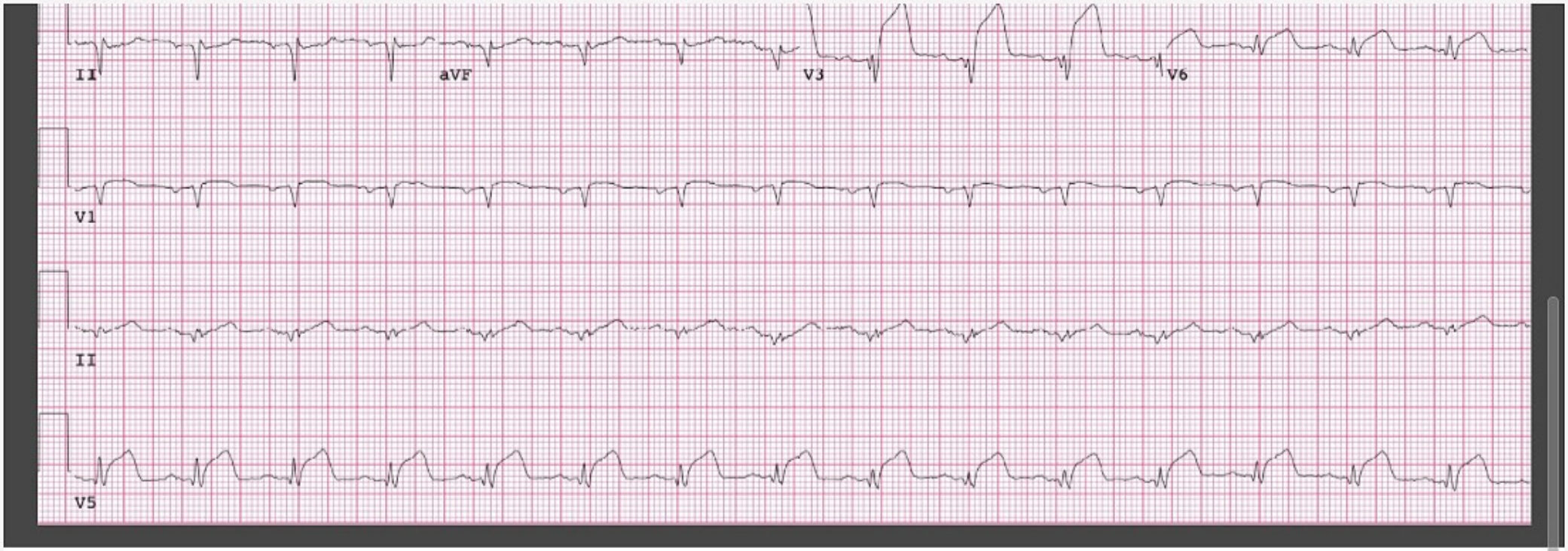
I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

During transport, you obtain the following 12-lead ECG. You transmit the 12-lead ECG to the hospital.

What will the emergency department physician most likely do when you arrive?



I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA



CHOOSE THE CORRECT ANSWER

Transfer the patient to an intensive care unit

Discharge the patient and have her follow up with her primary care provider

Observe the patient

✓ Transfer the patient to a cardiac cath lab for percutaneous coronary intervention

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

While you are giving a report to the hospital, the physician asks if the patient is able to follow verbal commands.

What intervention might be considered if the patient does not follow commands?

CHOOSE THE CORRECT ANSWER

- Administering vasopressors
- Transferring the patient to an intensive care unit
- ✓ Targeted temperature management
- Obtaining another ECG

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

Your score is: 67%

You will need to attempt completing the steps of the **Adult Post—Cardiac Arrest Care Algorithm** one more time.

Select **NEXT** to retry the questions you missed.

Adult Post—Cardiac Arrest Care Algorithm

Provider Manual

CHALLENGE US

NEXT

She has a palpable pulse, **HR** of 65/min **SpO_2** of 94%, **$ETCO_2$** of 38 mm Hg, and **BP** 82/55 mm Hg.

What are your highest priorities?

SELECT ALL THAT APPLY

- [x] Maintaining SpO_2 92% to 98%
- [ ] Hyperventilation
- [x] Ventilating the patient with 10 breaths per minute
- [ ] Maintaining a target $PaCO_2$ between 45 and 55 mm Hg
- [x] Maintaining a target $PaCO_2$ between 35 and 45 mm Hg

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

She has a palpable pulse, **HR** of 65/min **SpO_2** of 94%, **$ETCO_2$** of 38 mm Hg, and **BP** 82/55 mm Hg.

What are your highest priorities?

You got it!

Your Answer | Maintaining SpO_2 92% to 98%

Your Answer | Ventilating the patient with 10 breaths per minute

Algorithm

Learn more

Your Answer | Maintaining a target $PaCO_2$ between 35 and 45 mm Hg

I Know It

CHALLENGE US

NEXT

In addition to managing the airway and respiratory parameters, which step is also prioritized during the initial stabilization phase?

You got it!

Your Answer

Treating hypotension

Algorithm

Learn more

I Know It

CHALLENGE US

NEXT

Match the treatment for hypotension to the proper initial dosage for an adult based on the AHA guidelines.

You got it!

Norepinephrine IV	Epinephrine	Normal saline or lactated Ringer's	Dopamine IV
WHY	WHY	WHY	WHY
✓ 0.1 to 0.5 mcg/kg per minute	✓ 2 to 10 mcg per minute	✓ 1 to 2 L	✓ 5 to 20 mcg/kg per minute

I Know It

CHALLENGE US

NEXT

The patient's ventilation and blood pressure have responded to treatment.

What other lab or diagnostic tests would be appropriate to consider at this time for reversible causes?

SELECT ALL THAT APPLY

- [x] Arterial blood oxygen
- [x] Troponin test
- [x] Arterial blood carbon dioxide
- [x] Temperature
- [x] Capnography
- [x] 12-lead ECG

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

The patient's ventilation and blood pressure have responded to treatment.

What other lab or diagnostic tests would be appropriate to consider at this time for reversible causes?

Not there yet...

Your Answer — 12-lead ECG
Algorithm
Learn more

Your Answer — Troponin test

Your Answer — Temperature

Your Answer — Arterial blood oxygen
Consider treating any reversible causes that might have precipitated the cardiac arrest but persist after ROSC, including all H's and T's.

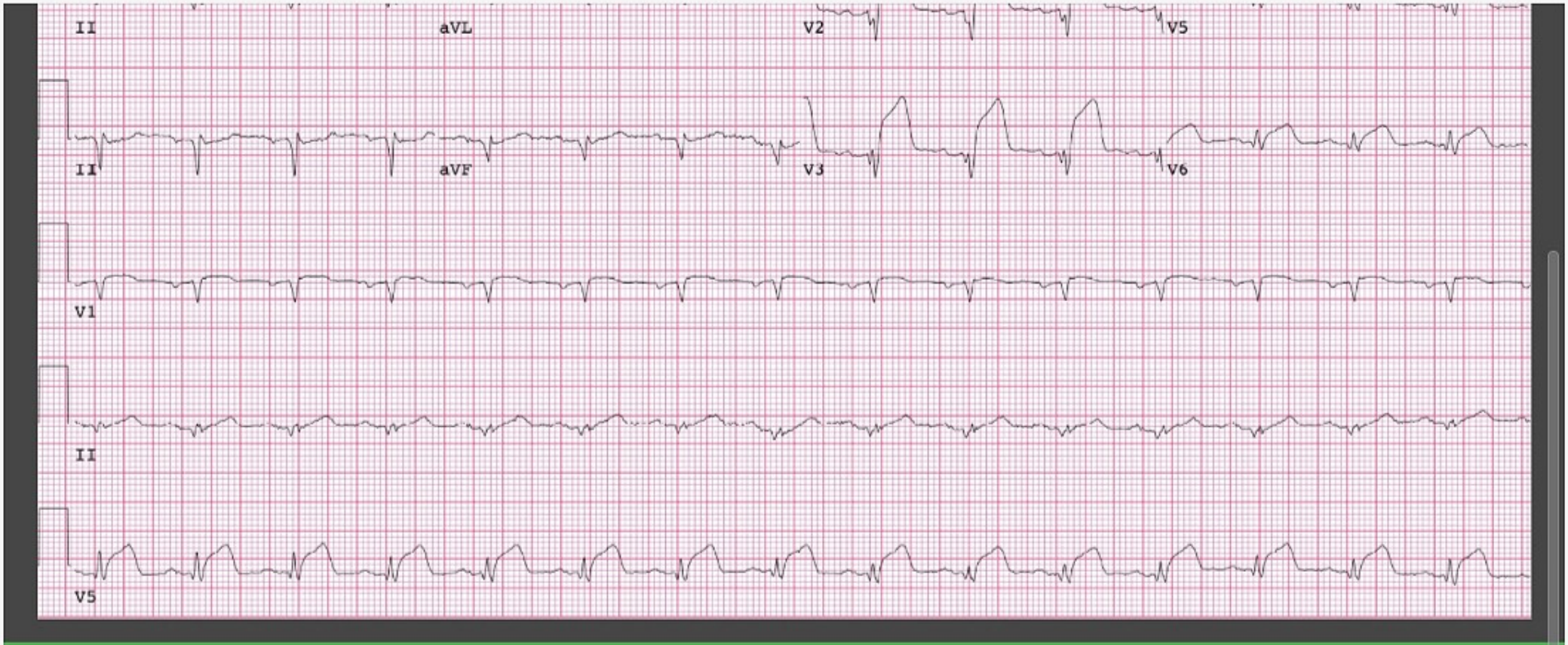
Your Answer — Arterial blood carbon dioxide
Consider treating any reversible causes that might have precipitated the cardiac arrest but persist after ROSC, including all H's and T's.

Your Answer — Capnography
Consider treating any reversible causes that might have precipitated the cardiac arrest but persist after ROSC, including all H's and T's.

I Know It

CHALLENGE US

NEXT



You got it!

Your Answer

Transfer the patient to a cardiac cath lab for percutaneous coronary intervention

Algorithm

Learn more

I Know It

CHALLENGE US

NEXT

While you are giving a report to the hospital, the physician asks if the patient is able to follow verbal commands.

What intervention might be considered if the patient does not follow commands?

You got it!

Your Answer

Targeted temperature management

Algorithm

Learn more

I Know It

CHALLENGE US

NEXT

1 2 3 4 5 6 7 8

Your score is: 100 %

Congratulations! You successfully completed steps of the **Adult Post—Cardiac Arrest Care Algorithm**.

Select **NEXT** to continue with the program.
If you wish to review the questions, click on the question numbers above.

Adult Post—Cardiac Arrest Care Algorithm

Provider Manual

CHALLENGE US NEXT

What is the recommended **initial therapy** for a patient with **stable narrow-complex tachycardia**, after establishing an **IV** and acquiring a **12-lead ECG**?

CHOOSE THE CORRECT ANSWER

Cardioversion

✓ Vagal maneuvers

β-Blockers

Adenosine

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

What is the recommended **initial therapy** for a patient with **stable narrow-complex tachycardia**, after establishing an **IV** and acquiring a **12-lead ECG**?

You got it!

Your Answer | **Vagal maneuvers**

I Know It

CHALLENGE US

NEXT

REAL-TIME FEEDBACK ON CPR QUALITY

CPR Performance Monitors

CPR performance monitors are now widely available, and they **provide invaluable real-time feedback on the quality of CPR** that rescuers deliver during resuscitative efforts. Physiologic end points are generally considered the best indicators of resuscitation effectiveness, but outside of a hospital setting, the only measure that is typically available is $ETCO_2$. **During CPR, $ETCO_2$ is a relative indicator of cardiac output** and can also signal ROSC, so this should be used if possible.

Immediately available feedback
• Chest compression rate
• Depth
• Recoil

Feedback for review
• Chest compression fraction
• Preshock, perishock, and postshock pauses
• Feedback that cannot be assessed adequately
• Ventilation rate
• Airway pressure
• Tidal volume

REAL-TIME FEEDBACK ON CPR QUALITY

efforts. Physiologic end points are generally considered the best indicators of resuscitation effectiveness, but outside of a hospital setting, the only measure that is typically available is $ETCO_2$. **During CPR, $ETCO_2$ is a relative indicator of cardiac output** and can also signal ROSC, so this should be used if possible.

Immediately available feedback

- Chest compression rate
- Depth
- Recoil

Feedback for review

- Chest compression fraction
- Preshock, perishock, and postshock pauses
- Feedback that cannot be assessed adequately
- Ventilation rate
- Airway pressure
- Tidal volume
- Inflation duration
- Other physiologic end points, if available (ie, $ETCO_2$, intra-arterial blood pressure, cardiac ultrasound)

REAL-TIME FEEDBACK ON CPR QUALITY

Quantitative Waveform Capnography

The AHA recommends using waveform capnography with a bag-mask device to confirm and monitor CPR quality. For intubated patients, use **quantitative waveform capnography to monitor CPR quality, optimize chest compressions, and detect ROSC during chest compressions.**

Although invasive monitors are usually not needed during CPR, physiologic parameters, such as intra-arterial relaxation pressures and central venous oxygen saturation ($ScvO_2$), may help optimize CPR and detect ROSC.

Animal and human studies indicate that monitoring **P_{ETCO_2}, CPP, and $ScvO_2$ provides valuable information on the patient's condition and response to therapy.** These physiologic parameters also correlate with cardiac output and myocardial blood flow during CPR, and when chest compressions fail to achieve identified threshold values, the patient rarely achieves ROSC.

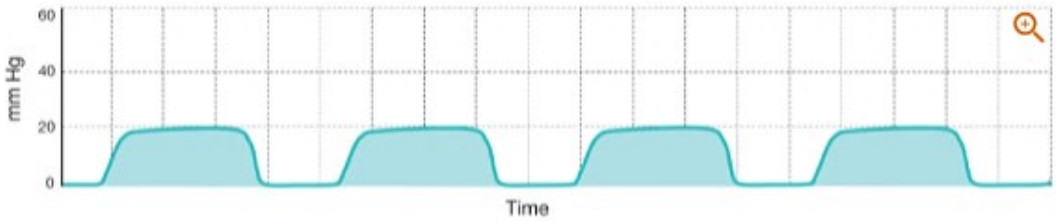
End-Tidal CO_2

The main determinant of P_{ETCO_2} during CPR is blood delivery (cardiac output) to the lungs. **Normal P_{ETCO_2} range is between 35 mm Hg and 45 mm Hg.** Persistently low P_{ETCO_2} values less than 10 mm Hg during CPR in intubated patients suggest that ROSC is unlikely, and it is reasonable to try to improve chest compressions and vasopressor therapy. If P_{ETCO_2} abruptly increases to a normal value of 35 to 40 mm Hg or higher, it is reasonable to consider this an indicator of ROSC.

REAL-TIME FEEDBACK ON CPR QUALITY

Physiologic Monitoring During CPR Examples

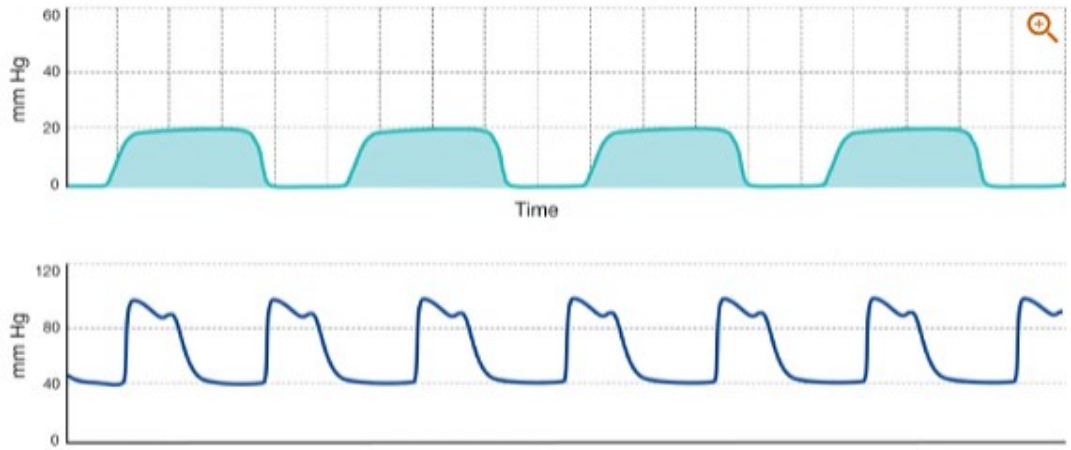
High-quality compressions are shown through **waveform capnography** and intra-arterial relaxation pressure.



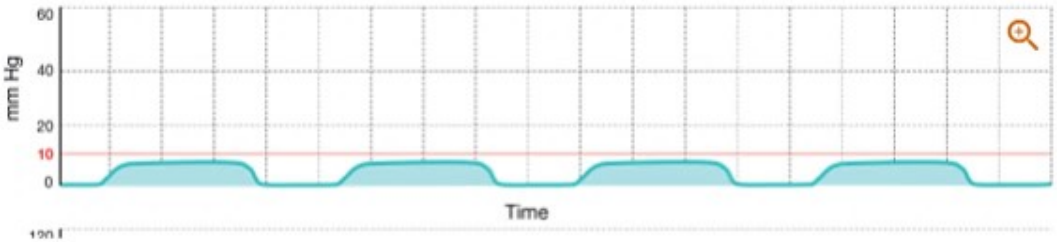
I KNEW | GOT IT NOW | THINK I GOT IT | I DON'T GET IT

REAL-TIME FEEDBACK ON CPR QUALITY

High-quality compressions are shown through **waveform capnography** and intra-arterial relaxation pressure.

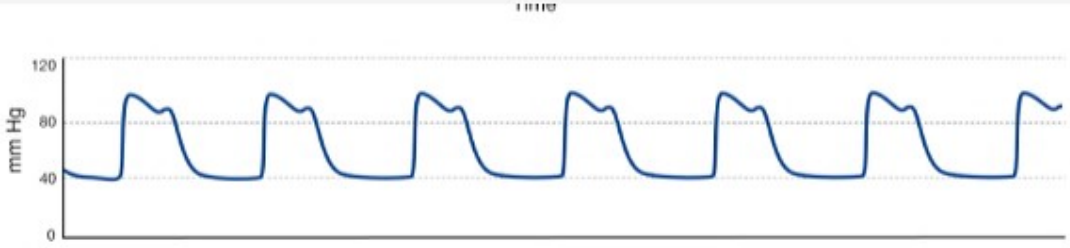


In this example, **ineffective CPR compressions** are shown through intra-arterial relaxation pressure and waveform capnography.

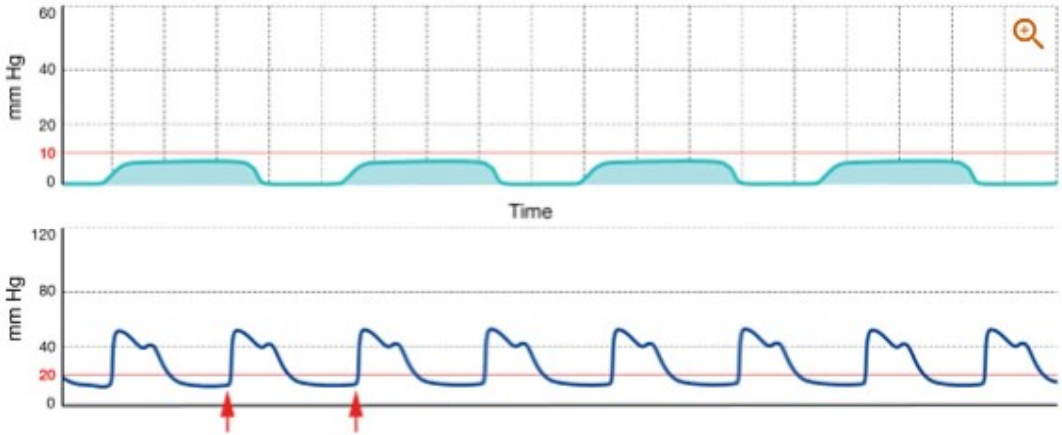


I KNEW | GOT IT NOW | THINK I GOT IT | I DON'T GET IT

REAL-TIME FEEDBACK ON CPR QUALITY



In this example, **ineffective CPR compressions** are shown through intra-arterial relaxation pressure and waveform capnography.



PREVIOUS 1 2 3

I KNEW | GOT IT NOW | THINK I GOT IT | I DON'T GET IT

Which of the following are immediately available as feedback from CPR performance monitors?

SELECT ALL THAT APPLY

- [x] Compression recoil
- [ ] Ventilation rate
- [x] Chest compression rate
- [ ] Chest compression fraction
- [x] Compression depth

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

Which of the following are **immediately available** as **feedback** from CPR performance monitors?

You got it!

- Your Answer | Chest compression rate
- Your Answer | Compression depth
- Your Answer | Compression recoil

I Know It

CHALLENGE US

NEXT

What are some of the **feedback functions** of CPR performance monitors that are available **for review during CPR?**

SELECT ALL THAT APPLY

- [x] Tidal volume
- [x] Preshock, perishock, and postshock pauses
- [x] Chest compression fraction
- [ ] Compression recoil
- [ ] Compression depth
- [ ] Chest compression rate

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

What are some of the **feedback functions** of CPR performance monitors that are available **for review during CPR**?

Not there yet...

Missed Answer	**Compression recoil**	This function is available during CPR.
Missed Answer	**Compression depth**	This function is available during CPR.
Missed Answer	**Chest compression rate**	This function is available during CPR.
Your Answer	**Chest compression fraction**	
Your Answer	**Preshock, perishock, and postshock pauses**	
Your Answer	**Tidal volume**	

Learn more here: Real-time Feedback on CPR Quality

I Know It

CHALLENGE US

NEXT

What is the normal $PETCO_2$ range?

CHOOSE THE CORRECT ANSWER

25% to 35%

✓ 35 to 45 mm Hg

25 to 35 mm Hg

35% to 45%

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

What is the normal $PETCO_2$ range?

You got it!

Your Answer | 35 to 45 mm Hg

I Know It

CHALLENGE US

NEXT

What is the main determinant of end-tidal carbon dioxide ($ETCO_2$) measurement during CPR?

CHOOSE THE CORRECT ANSWER

- ✓ Blood delivery to the lungs
- Assisted ventilation rate
- Alveolar membrane permeability
- Tidal volume

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

What is the **main determinant of end-tidal carbon dioxide** ($ETCO_2$) measurement during CPR?

You got it!

Your Answer | **Blood delivery to the lungs**

I Know It

CHALLENGE US

NEXT

What is the only CPR performance monitor typically available for measuring a physiologic end point outside of a hospital setting?

CHOOSE THE CORRECT ANSWER

Intra-arterial relaxation pressure

Cerebral perfusion pressure

✓ End-tidal carbon dioxide ($ETCO_2$)

Central venous oxygen saturation

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

What is the **only CPR performance monitor** typically available for measuring a physiologic end point **outside of a hospital setting?**

You got it!

Your Answer | **End-tidal carbon dioxide ($ETCO_2$)**

I Know It

CHALLENGE US

NEXT

What invasive CPR performance measure reflects changes in cardiac output due to chest compressions, if oxygen consumption, arterial oxygen saturation, and hemoglobin remain constant?

CHOOSE THE CORRECT ANSWER

Oxygen saturation by pulse oximetry

✓ End-tidal carbon dioxide measure

Central venous oxygen saturation

Arterial relaxation pressure

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

What invasive CPR performance measure **reflects changes in cardiac output due to chest compressions**, if oxygen consumption, arterial oxygen saturation, and hemoglobin remain constant?

Not there yet...

Your Answer | End-tidal carbon dioxide measure

Correct Answer | Central venous oxygen saturation

Learn more here: Real-time Feedback on CPR Quality

Think So

CHALLENGE US

NEXT

Introduction

Your advanced life support team is treating a 49-year-old woman who says she's had chest discomfort and palpitations for the past several hours. She feels cold, sweaty, and weak.

CHALLENGE US

NEXT

When you walk in, you find that the patient is awake and alert, sitting in her kitchen. You confirm that she has a pulse and is breathing normally. She states that she does not have any medical history and has never felt like this before. She mentions that she feels like she may pass out.

Which of the following are initial steps of the primary assessment?

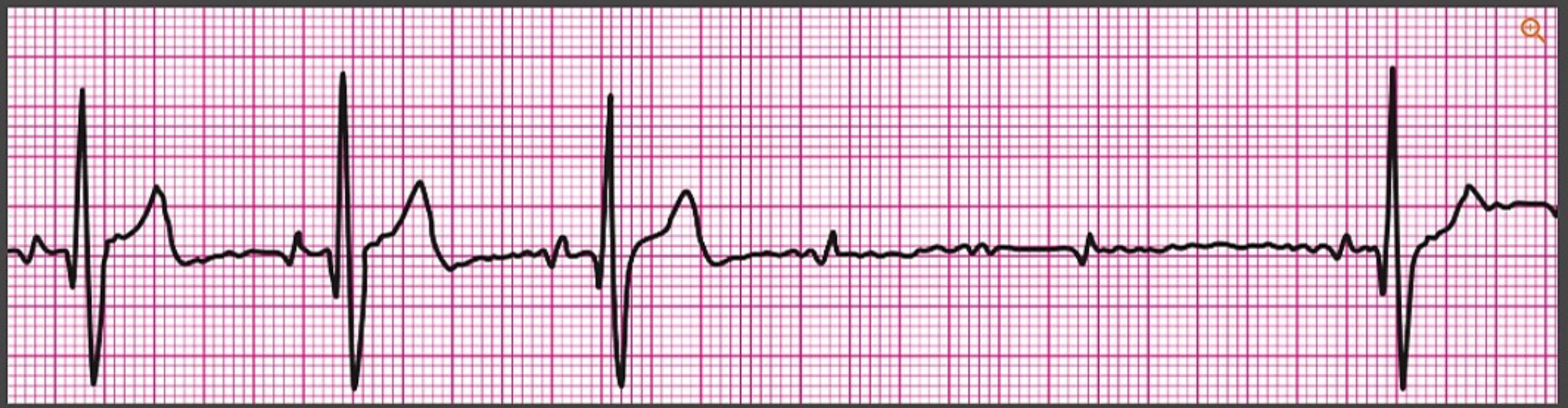
SELECT ALL THAT APPLY

- [x] Obtain a focused history
- [x] Investigate H's and T's
- [x] Monitor heart rhythm and vital signs
- [x] Establish IV access
- [x] Obtain a 12-lead electrocardiogram (ECG)
- [x] Assess airway, breathing, and circulation (ABCs)

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

The patient is placed on the heart monitor.

What is her heart rhythm?



CHOOSE THE CORRECT ANSWER

Sinus bradycardia

Mobitz type I second-degree AV block

✓ Mobitz type II second-degree AV block

Atrial fibrillation

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

The patient's vital signs are **HR** 37/min, **BP** 77/50 mm Hg, **RR** 15/min, **SpO_2** 97%, and **temperature** 98.8°F (37.1°C).

What is the first-line drug for acute symptomatic bradycardia?

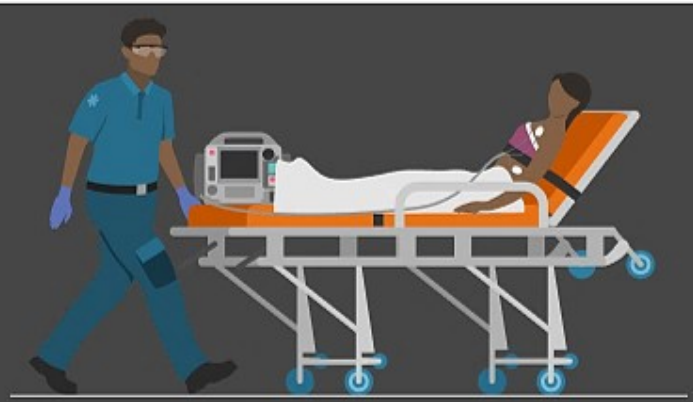
CHOOSE THE CORRECT ANSWER

- Synchronized cardioversion
- Epinephrine
- ✓ Atropine
- Monitoring and observing

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

You administer a 1 mg bolus of atropine, which is ineffective. You prepare to initiate transcutaneous pacing.

What steps should be followed to start pacing?



SELECT ALL THAT APPLY

- [ ] Charge the defibrillator to 150 J
- [ ] Administer amiodarone infusion
- [x] Ideally, administer a sedative and analgesic for conscious patients
- [x] Attach pacing electrodes on the chest according to package instructions
- [x] Set the current (milliamperes)
- [x] Set the demand rate
- [x] Turn the pacer on

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

What is an appropriate demand rate for the transcutaneous pacer?

CHOOSE THE CORRECT ANSWER

- 0 to 50/min
- 80 to 100/min
- 100 to 120/min
- ✓ 60 to 80/min

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

You initiated transcutaneous pacing but are unable to palpate a pulse that matches your electrical capture.

Do you have mechanical capture?

CHOOSE THE CORRECT ANSWER

No

Yes

Not enough information

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

The patient suddenly loses consciousness and stops breathing. You assess the underlying ECG rhythm.

What is this rhythm?

CHOOSE THE CORRECT ANSWER

- ✓ Ventricular fibrillation
- Ventricular tachycardia
- PEA
- Asystole

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

What is the most important next action for this patient?

CHOOSE THE CORRECT ANSWER

Intubate the patient

✓ Deliver a shock

Immediately start high-quality CPR

Administer amiodarone

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

The team started CPR immediately after delivering the shock. After 2 minutes, the rhythm was unchanged and a second shock was delivered.

What medication can be administered at this time?

CHOOSE THE CORRECT ANSWER

- Epinephrine 3 mg
- Atropine 1 mg IV
- Amiodarone 100 mg IV
- ✓ Epinephrine 1 mg IV

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

After securing the endotracheal tube, what ratio of compressions to ventilations should you deliver?

CHOOSE THE CORRECT ANSWER

- ✓ Continuous compressions with 1 breath every 6 seconds
- 30 compressions to 2 ventilations
- 30 compressions with continuous ventilations
- 30 compressions to 1 ventilation

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

The patient remains in ventricular fibrillation after another 2 minutes of CPR.

What additional medication can you administer?

CHOOSE THE CORRECT ANSWER

- Amiodarone 150 mg IV
- Procainamide 10 mg IV
- ✓ Amiodarone 300 mg IV
- Epinephrine 4 mg IV

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

The patient is showing signs of return of spontaneous circulation (ROSC). She has a palpable pulse, **HR** 65/min, **SpO_2** 94%, **$ETCO_2$** 38 mm Hg, and **BP** 82/55 mm Hg.

Which are the highest-priority interventions per the Adult Post—Cardiac Arrest Care Algorithm?

SELECT ALL THAT APPLY

- [ ] Hyperventilation
- [x] Maintaining a target $PaCO_2$ between 35 and 45 mm Hg
- [ ] Ventilating the patient with 6 breaths per minute
- [x] Ventilating the patient with 10 breaths per minute
- [ ] Maintain systolic blood pressure at least 100 mm Hg
- [x] Maintaining SpO_2 92% to 98%

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

In addition to managing the airway and respiratory parameters, which step is also prioritized during the initial stabilization phase?

CHOOSE THE CORRECT ANSWER

Initiating targeted temperature management

✓ Treating hypotension

Administering alteplase

Performing percutaneous coronary intervention

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

Your score is: 85%

You will need to attempt completing the steps of the **Megacode** one more time.

Select **NEXT** to retry the questions you missed.

Adult Bradycardia Algorithm

Adult Cardiac Arrest Algorithm

Adult Post—Cardiac Arrest Care Algorithm

Provider Manual

CHALLENGE US

NEXT

When you walk in, you find that the patient is awake and alert, sitting in her kitchen. You confirm that she has a pulse and is breathing normally. She states that she does not have any medical history and has never felt like this before. She mentions that she feels like she may pass out.

Which of the following are initial steps of the primary assessment?

SELECT ALL THAT APPLY

- [x] Establish IV access
- [x] Obtain a 12-lead electrocardiogram (ECG)
- [x] Monitor heart rhythm and vital signs
- [ ] Obtain a focused history
- [x] Assess airway, breathing, and circulation (ABCs)
- [ ] Investigate H's and T's

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

When you walk in, you find that the patient is awake and alert, sitting in her kitchen. You confirm that she has a pulse and is breathing normally. She states that she does not have any medical history and has never felt like this before. She mentions that she feels like she may pass out.

Which of the following are initial steps of the primary assessment?

You got it!

- Your Answer | Assess airway, breathing, and circulation (ABCs)
  - Algorithm
  - Learn more
- Your Answer | Establish IV access
- Your Answer | Obtain a 12-lead electrocardiogram (ECG)
- Your Answer | Monitor heart rhythm and vital signs

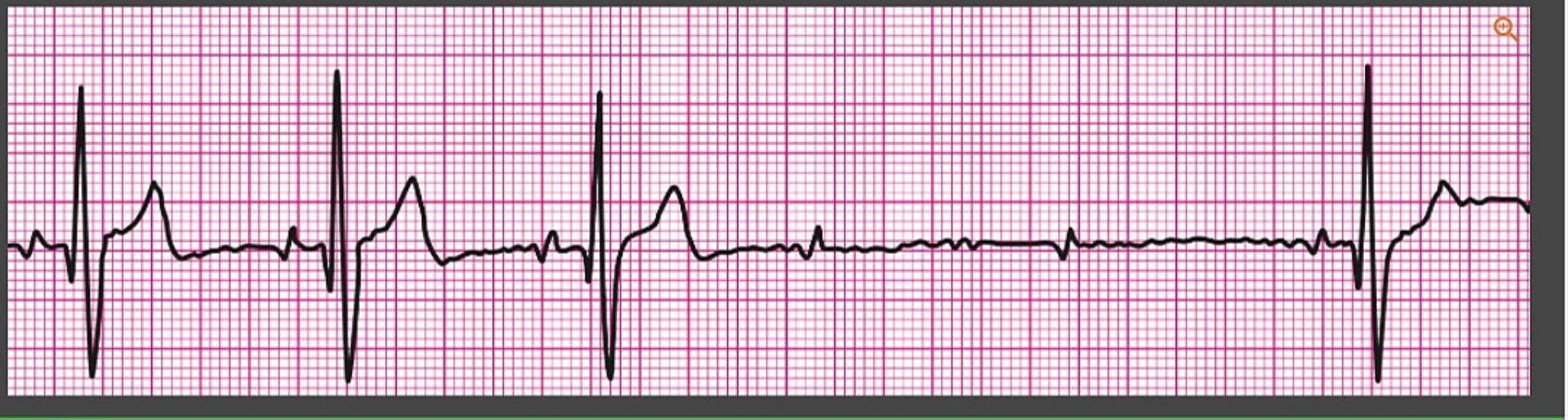
I Know It

CHALLENGE US

NEXT

The patient is placed on the heart monitor.

What is her heart rhythm?



You got it!

Your Answer | Mobitz type II second-degree AV block

Learn more

I Know It

CHALLENGE US

NEXT

The patient's vital signs are **HR** 37/min, **BP** 77/50 mm Hg, **RR** 15/min, **SpO_2** 97%, and **temperature** 98.8°F (37.1°C).

What is the first-line drug for acute symptomatic bradycardia?

You got it!

Your Answer

Atropine

Algorithm

Learn more

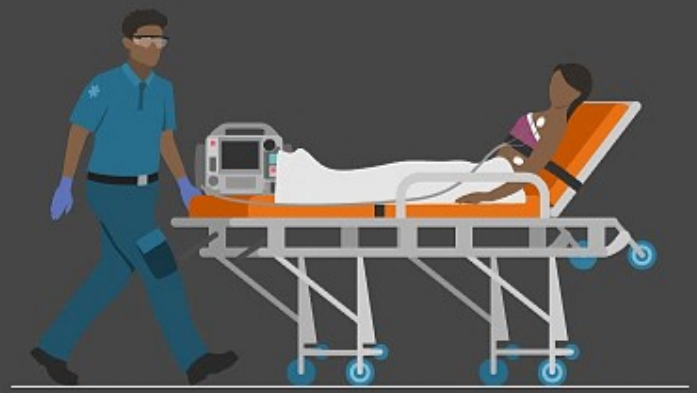
I Know It

CHALLENGE US

NEXT

You administer a 1 mg bolus of atropine, which is ineffective. You prepare to initiate transcutaneous pacing.

What steps should be followed to start pacing?



You got it!

- Your Answer | Attach pacing electrodes on the chest according to package instructions
  - Algorithm
  - Learn more
- Your Answer | Set the current (milliamperes)
- Your Answer | Set the demand rate
- Your Answer | Turn the pacer on
- Your Answer | Ideally, administer a sedative and analgesic for conscious patients

I Know It

CHALLENGE US

NEXT

95% | PROGRESS: HeartCode ACLS 2025

~1h 30m left

Ahmed Othman

What is an appropriate demand rate for the transcutaneous pacer?

You got it!

Your Answer | 60 to 80/min

Learn more

I Know It

CHALLENGE US

NEXT

You initiated transcutaneous pacing but are unable to palpate a pulse that matches your electrical capture.

Do you have mechanical capture?

CHOOSE THE CORRECT ANSWER

Not enough information

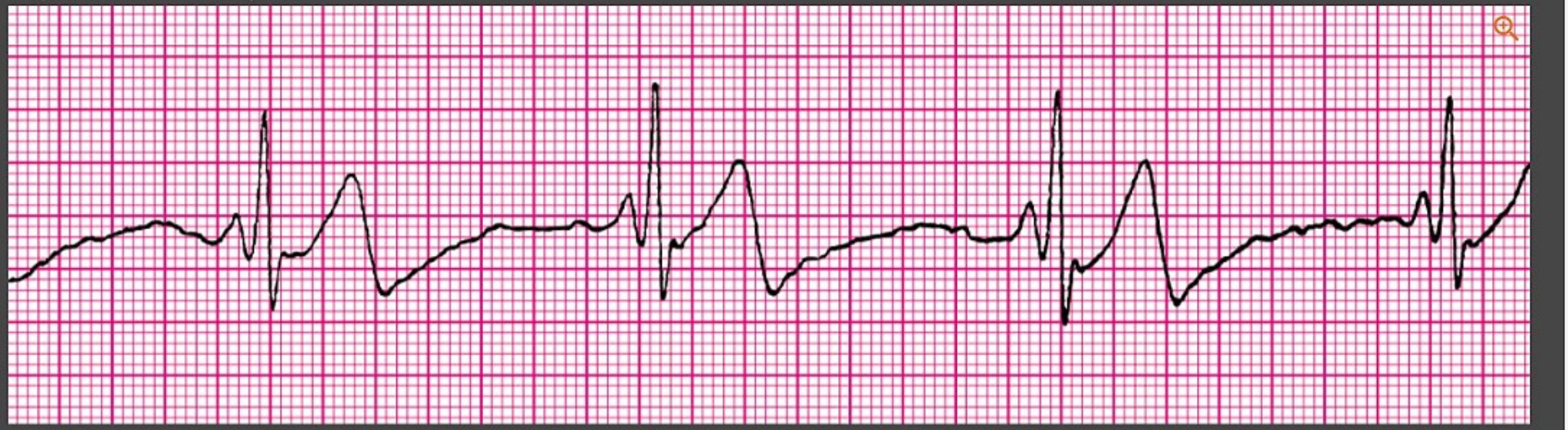
✓ No

Yes

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

You initiated transcutaneous pacing but are unable to palpate a pulse that matches your electrical capture.

Do you have mechanical capture?



You got it!

Your Answer | No

Learn more

I Know It

CHALLENGE US

NEXT

The patient suddenly loses consciousness and stops breathing. You assess the underlying ECG rhythm.

What is this rhythm?

You got it!

Your Answer | Ventricular fibrillation

Learn more

I Know It

CHALLENGE US

NEXT

What is the most important next action for this patient?

You got it!

Your Answer

Deliver a shock

Algorithm

Learn more

I Know It

CHALLENGE US

NEXT

The team started CPR immediately after delivering the shock. After 2 minutes, the rhythm was unchanged and a second shock was delivered.

What medication can be administered at this time?

You got it!

Your Answer

Epinephrine 1 mg IV

Algorithm

Learn more

I Know It

CHALLENGE US

NEXT

After securing the endotracheal tube, what ratio of compressions to ventilations should you deliver?

You got it!

Your Answer

Continuous compressions with 1 breath every 6 seconds

Algorithm

Learn more

I Know It

CHALLENGE US

NEXT

The patient remains in ventricular fibrillation after another 2 minutes of CPR.

What additional medication can you administer?

You got it!

Your Answer

Amiodarone 300 mg IV

Algorithm

Learn more

I Know It

CHALLENGE US

NEXT

The patient is showing signs of return of spontaneous circulation (ROSC). She has a palpable pulse, **HR** 65/min, **SpO_2** 94%, **$ETCO_2$** 38 mm Hg, and **BP** 82/55 mm Hg.

Which are the highest-priority interventions per the Adult Post—Cardiac Arrest Care Algorithm?

You got it!

Your Answer | Maintaining SpO_2 92% to 98%

Algorithm

Learn more

Your Answer | Ventilating the patient with 10 breaths per minute

Your Answer | Maintaining a target $PaCO_2$ between 35 and 45 mm Hg

I Know It

CHALLENGE US

NEXT

In addition to managing the airway and respiratory parameters, which step is also prioritized during the initial stabilization phase?

You got it!

Your Answer

Treating hypotension

Algorithm

Learn more

I Know It

CHALLENGE US

NEXT

1 — 2 — 3 — 4 — 5 — 6 — 7 — 8 — 9 — 10 — 11 — 12 — 13 — 14 — 15

Your score is: 100 %

Congratulations! You successfully completed steps of the **Megacode**.

Select **NEXT** to continue with the program.
If you wish to review the questions, click on the question numbers above.

Adult Bradycardia Algorithm

Adult Cardiac Arrest Algorithm

Adult Post—Cardiac Arrest Care Algorithm

Provider Manual

CHALLENGE US

NEXT

What are some of the **feedback functions** of CPR performance monitors that are available **for review during CPR?**

SELECT ALL THAT APPLY

- [ ] Feedback that cannot be assessed adequately
- [ ] Ventilation rate
- [x] Chest compression rate
- [ ] Chest compression fraction
- [x] Compression recoil
- [x] Compression depth

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

What are some of the **feedback functions** of CPR performance monitors that are available **for review during CPR?**

You got it!

✓	Your Answer	**Compression depth** This function is available during CPR.
✓	Your Answer	**Compression recoil** This function is available during CPR.
✓	Your Answer	**Chest compression rate** This function is available during CPR.

I Know It

CHALLENGE US

NEXT

TI Ahmed Othm

Which are examples of mutual respect?

Almost there!

Your Answer | Ensuring that only 1 person talks at a time

Missed Answer | Acknowledging correctly completed tasks in a positive way

Learn more here: How to Communicate

I Know It

CHALLENGE US

NEXT

Which **alteration to the standard ACLS algorithm** is appropriate for patients whose **cardiac arrest is caused by hypothermia?**

Not there yet...

Your Answer | Increased medication doses

Correct Answer | Medications spaced at longer intervals

Learn more here: VF/pVT in Accidental Hypothermia

I Know It

CHALLENGE US

NEXT

What is an **advantage** of placing a post–cardiac arrest patient in a **critical care bed after coronary reperfusion** interventions?

Not there yet...

Your Answer | Targeted temperature management occurs there

Correct Answer | Experts can perform timely neurologic evaluation

Learn more here: Appropriate Destination for a Patient in the Post-Cardiac Arrest Period

Think So

CHALLENGE US

NEXT

What is the main advantage of effective teamwork?

CHOOSE THE CORRECT ANSWER

Early defibrillation

Mastery of resuscitation skills

Immediate CPR

✓ Division of tasks

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

What is the **main advantage** of **effective teamwork?**

You got it!

Your Answer | **Division of tasks**

Think So

CHALLENGE US

NEXT

Which therapy is **not supported by evidence** for use in patients with **cardiac arrest secondary to hypothermia?**

You got it!

Your Answer | **Antiarrhythmics**

Think So

CHALLENGE US

NEXT

Which are **examples** of **mutual respect?**

You got it!

Your Answer | Ensuring that only 1 person talks at a time

Your Answer | Acknowledging correctly completed tasks in a positive way

I Know It

CHALLENGE US

NEXT

IHCA SURVIVAL RATES

IHCA Survival Rate

Mortality from IHCA remains high. Only about **1 in 4 patients survive an in-hospital cardiac arrest** despite significant advances in treatments. Survival rates are particularly poor for IHCAs associated with rhythms other than VF/pVT. **Non-VF/pVT rhythms are present in the majority of arrests in the hospital**.

When IHCAs do occur, poor-quality CPR should be considered a preventable harm. In healthcare environments, clinician performance of CPR varies widely, affecting the ability to reduce healthcare-associated complications. Researchers advocate a standardized approach to improve outcomes and reduce preventable harms.

I KNEW | GOT IT NOW | THINK I GOT IT | I DON'T GET IT

CHALLENGE US

YOU GOT IT!

WELL DONE!

YOU COMPLETED THIS MODULE

09:13:24

Total time spent

00:02:06

Spent per item